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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/685,550

10/14/2003

Wayne G. Renken

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EXAMINER

SHAH, SAMIR M

ART UNIT

PAPER NUMBER

2856

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/685,550

Applicant(s)

RENKEN, WAYNE G.

Examiner

Samir M. Shah

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-25, 27-36 and 45-54 is/are pending in the application.
- 4a) Of the above claim(s) 47-54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-25 and 27-36 is/are rejected.
- 7) ☒ Claim(s) 45 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 7, filed 12/20/2006, with respect to claims 33 and 36 have been fully considered and are persuasive. The objection of claim 36 and the 35 U.S.C. 112(2nd) rejection of claims 33 and 36 have been withdrawn.

2. Applicant's arguments filed 12/20/2006, with respect to the 35 U.S.C. 102(b) rejection of claims 21, 28, 30, 31 and 35 as being anticipated by Lauf et al. (US Patent 5,969,639 henceforth "Lauf") have been fully considered but they are not persuasive.

(a) [Claim 21] As to Applicant's argument, "leads (740) of Lauf (cited in the Office Action) do not appear to be disclosed as flexible or allowing relative movement between wafer (710) and signal conditioning circuit (730)...Lauf does not appear to indicate...that leads 740 are flexible such that they would allow such movement", the Examiner disagrees.

Lauf discloses leads (740) connecting electronic module/signal conditioning circuit (730) to different sensors/transducers (720) mounted on the substrate/wafer (710) (figures 7, 10; column 3, lines 45-61). Further, Lauf discloses, "without regard to any particular drawing", a "movable detector" (column 5, lines 45-50). The movable detector, in order to be movable, would clearly require the leads (740) to be flexible and further allowing relative movement between wafer (710) and signal conditioning circuit (730).

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(b) [Claim 31] As to Applicant's argument, "cited portion of Lauf appears to refer to IR emitting diodes and does not appear to show IR signals received by elements on wafer 710", the Examiner disagrees.

In addition to IR emitting diodes, Lauf also discloses "IR detector(s)" that could "respond to changing IR signals associated with the signal from the infrared emitting diode that is intended to be interrogated" (column 5, lines 25-55, especially lines 45-55).

3. Applicant's arguments filed 12/20/2006, with respect to the 35 U.S.C. 103(a) rejection of claims 22, 24, 25, 27, 32, 33 as being unpatentable over Lauf in view of Smesny et al. (US Patent 5,444,637 henceforth "Smesny") have been fully considered but they are not persuasive.

(a) [Claim 22] As to Applicant's argument, "motivation...to obtain the claimed combination ("an amplified signal can be more accurately read/processed") is not well understood...No source was provided for this motivation", please note that a source is not always required for a motivation in making combination of prior art references. There are instances when the motivation or a suggestion to combine can be found in the knowledge generally available to one of ordinary skill in the art, and such a situation would eliminate the need to produce a source for the motivation.

In particular, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the

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claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, Applicant seems to have ignored a part of the motivation provided in the Office Action, i.e., "because sensors such as thermistors or RTD are well suited for producing an output voltage proportional to the sensor resistance". In other words, it is known in the knowledge generally available to one of ordinary skill in the art of sensing and electronic amplification that an amplified output signal from these type of sensors that produce an output voltage proportional to a resistance value can be more accurately read/processed (because an amplified output would be a larger version of the original signal).

(b) [Claim 24] As to Applicant's argument, "Office Action indicated that the sensors of Lauf inherently require an input power signal...it does not appear that such an input power signal (assuming it was provided) would necessarily come from signal condition circuit 730", the Examiner disagrees.

Lauf discloses "Each sensor can be energized by a common voltage source" (column 5, lines 10-16). Further, Lauf discloses "the device must have its own power supply to drive its circuits and transmitter". Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf to place the power supply, suggested by Smesny, in the electronics module/signal conditioning

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circuit (730) because this would provide input power supply to drive Lauf's circuits and transmitter (as required by Lauf), which are also included in the electronics module (730).

(c) [Claim 27] As to Applicant's argument, "the motivation to combine the analog to digital converter of Smesny with the apparatus of Lauf is not clear...the cited portion of Lauf does not appear to disclose that digital signals can be more accurately processed or that they are more easily converted into useful information", the Examiner disagrees.

As stated in the previous Office Action, Lauf discloses "the transmitted signals can be digital or analog" (column 4, lines 25-28) and further discloses "Module 850 can include an external data processing device for converting the output signal into useful information for a function selected from the group consisting of display, storage, and retrieval" (column 4, lines 37-42). It was clearly well known to one of ordinary skill in the art of data processing at the time the invention was made that digital signals, as compared to analog signals, would be more accurately processed or more easily converted into useful information for functions such as display, storage and retrieval (as required by Lauf).

(d) [Claim 32] As to Applicant's argument, "Lauf appears to disclose using RF communication...and it not seen how modifying the apparatus of Lauf for acoustic communication would provide an advantage", the Examiner disagrees.

Smesny discloses "Probe pad 26 can...be a non-contact receptor for allowing optical or acoustic access from an external communication device" (column 7, lines 55-60), suggesting that optical transmission and acoustic transmission are alternative methods for wireless communication (emphasis added). Moreover, Lauf discloses "RF must be interpreted broadly to include radio frequencies, microwaves, and optical transmissions" (column 4, lines 20-27) (emphasis added). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use optical/acoustic transmission in Lauf's apparatus since it would be an alternative method of wireless communication, as suggested by both Smesny and Lauf.

(e) [Claim 33] As to Applicant's argument, "the cited motivation to modify the apparatus of Lauf according to Smesny...is not understood... Given that the apparatus of Lauf includes RF communication...it is not clear what would motivate one of skill to modify the apparatus of Lauf for mechanical access", the Examiner clarifies as follows:

Smesny discloses a probe pad (26) configured for allowing mechanical access from an external output device "necessary for receiving digital information stored within the read/write memory of processor 20" and further discloses "pad 26 can also be a non-contact receptor for...access from an external communication device" (column 7, lines 52-61). Thus, Smesny shows that mechanical access and wireless access are two alternative methods of external communication. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include a mechanical connection with the remote data processing system

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(850) because a mechanical connection would be cheaper than a wireless connection as it would eliminate the need for power-supplies driving transmission circuitry.

4. Applicant's arguments filed 12/20/2006, with respect to the 35 U.S.C. 103(a) rejection of claims 23, 29 and 34 as being unpatentable over Lauf in view of Schwartz et al. (US Patent 5,669,713 henceforth "Schwartz") have been fully considered but they are not persuasive.

(a) [Claims 23, 29, 34] As to Applicant's argument, "Because no motivation is provided for processing the output at the electronics module (in claim 23) or at the remote system (in claim 29), a *prima facie* case of obviousness has not been made with respect to these claims", the Examiner disagrees.

However, it is held that *there would be no invention in shifting the parts of a device to a different position if the operation of the device would not thereby be modified. In re Japiske, 86 USPQ 70 (CCPA 1950)*. Note that the Examiner's contention of obvious choice in design can be overcome if Applicant establishes unexpected results. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus in order to process the output (using microcontroller, as suggested by Schwartz) at the electronics module/signal conditioning circuit (730) or at the remote system/module (850), because this would be a mere design choice. Because no argument is provided by Applicant, showing an unexpected result (which would not be expected by a person of ordinary skill in the art)

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due to the placement of the micro-controller at a particular position (defined in claims 23, 29, 34), such a placement is only considered a mere design choice and the rejection of claims 23, 29 and 34 is maintained.

Moreover, it is well known in the art that micro-controllers are small-sized integrated circuits on a chip and they can substitute the role of a computer in most situations. This would help to make Lauf's overall device more compact. In addition, Lauf discloses that "the circuit 730 can includes [sic] a clock and a memory where temperature data can be captured at selected times and stored for later retrieval" (column 3, lines 61-66). Thus, circuit 730 is clearly a micro-controller. However, since Lauf does not refer to the circuit as a micro-controller, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to use a micro-controller for achieving desired functionality through circuit (730). Also, micro-controllers inherently possess accuracy and speed.

Similarly, Lauf discloses "module 850 can include an external data processing device for converting the output signal into useful information for a function selected from the group consisting of display, storage, and retrieval...the received data is then sent to a computer 860 with a high resolution color monitor 870" (column 4, lines 34-42). Therefore, as mentioned above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a micro-controller/processor to control module (850) for achieving the desired functionality rapidly and accurately.

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5. Applicant's arguments filed 12/20/2006, with respect to the 35 U.S.C. 103(a) rejection of claim 36 as being unpatentable over Lauf in view of Renken et al. (US Patent 6,190,040 henceforth "Renken") have been fully considered but they are not persuasive.

Lauf discloses a prior art drawing (figure 1), similar to Renken, and further shows a sheathed lead section (150) (similar to Renken's sheathed flat cable ribbon (52, 62)), which connects sensors (120) on substrate (110) to a connector (160) for carrying/transmitting signals to an external measurement system (column 1, lines 51-61). Lauf's leads (740) connect sensors (720) on substrate (710) to a signal conditioning circuit (730) which also contains a transmitter (750) for carrying/transmitting signals to an external measurement system/module (850) (figure 7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ribbon cables in the alternative of Lauf's leads (740) because this would achieve similar functionality. As for the benefits of using a ribbon cable, refer to the NPL document, "Ribbon Cable", cited in the attached 892 form.

6. Applicant's arguments, see pages 12-13, filed 12/20/2006, with respect to claims 45 and 46 have been fully considered and are persuasive. The 35 U.S.C. 103(a) rejection of claims 45 and 46 has been withdrawn.

Claim Rejections - 35 USC § 102

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7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 21, 28, 30, 31 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Lauf et al. (US Patent 5,969,639 henceforth "Lauf").

(a) As to claims 21, 28, 30 and 35, Lauf discloses a process condition monitoring device comprising:

a substrate/wafer (710) having a first perimeter, the substrate/wafer (710) comprising sensors (720) to measure the processing conditions/temperature of the substrate/wafer (710) at different areas of the substrate/wafer (710) (figure 7; column 3, lines 46-50; column 6, lines 40-42);

an electronics module/signal conditioning circuit (730) having a second perimeter that encloses the same or less area than the first perimeter, the module/circuit (730) comprising (figure 7, column 3, lines 50-52; column 4, lines 15-18):

signal acquisition circuitry ("circuit 730 includes a clock and a memory whereby temperature data can be captured... and stored for later retrieval") coupled to an output of the sensors (720) (figure 7; column 3, lines 63-66);

data transmission circuitry/transmitter (750) and antenna

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(770) coupled to the signal acquisition circuitry (730) (figure 7; column 3, lines 52-61);

a power source (760) (figure 7; column 3, lines 58-59); and

leads (740) connecting the substrate/wafer (710) to the electronics module/signal conditioning circuit (730) for transmitting signals between the substrate/wafer (710) and the electronics module/signal conditioning circuit (730), the leads (740) providing a flexible connection that allows relative movement between the substrate/wafer (710) and the electronics module/signal conditioning circuit (730) (figure 7; column 3, lines 45-61); and

a remote data processing system/module (850) including an external data processing device, and wherein the data transmission circuitry/transmitter (750) and antenna (770) comprises a wireless/radio frequency (RF) transceiver to transmit the processing conditions to the remote system/module (850) (figures 7, 8; column 3, lines 52-61; column 4, lines 29-42).

(b) As to claim 31, Lauf discloses an infrared (IR) structure located on the surface of the wafer (710), which would enable the transmitting and receiving of IR signals (column 5, lines 25-55).

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 22, 24, 25, 27, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Smesny et al. (US Patent 5,444,637 henceforth "Smesny").

(a) As to claim 22, Lauf does not expressly teach the signal acquisition circuitry being configured to amplify an output signal of the sensors. However, Lauf discloses that the sensors (720) could be thermocouple, diode, resistive temperature detectors (RTD) or thermistors (claim 7; column 2, lines 13-18; column 4, lines 29-34); Lauf also discloses that "either amplitude or frequency modulation can be used" (column 4, lines 25-28).

Smesny discloses a "programmable semiconductor wafer for sensing, recording and retrieving fabrication process conditions" including sensors (12), which could be thermistors, thermocouple or diode (column 8, lines 63-68; column 9, lines 1-27) and an amplifier (46) configured to amplify an output signal of the sensors (12) (figure 3; column 10, lines 38-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include amplifying an output signal of the sensors (720), as suggested by Smesny, because sensors such as thermistors or RTD are well suited for producing an output voltage proportional to the sensor resistance and an amplified signal can be more accurately read/processed.

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(b) As to claims 24 and 25, the resistance type temperature sensors of Lauf inherently require an input power signal in order to function as disclosed.

In the alternative, Smesny discloses a power supply (16) for "providing analog voltage level with sufficient current drive to sensors (12)" (column 8, lines 20-22).

It would be obvious to one of ordinary skill in the art at the time the invention was made to include a power supply for providing input power signals to sensors (720), as suggested by Smesny, because an input power signal is required for temperature sensors such as thermocouple or thermistors to function appropriately.

(c) As to claim 27, Lauf does not expressly teach that the data transmission circuitry/transmitter (750) and antenna (770) comprises an analog to digital converter. However, Lauf discloses that "the transmitted signals can be digital or analog (column 4, lines 25-28).

Smesny discloses a signal acquisition/conditioning circuit or an analog to digital (A/D) converter (52) which receives analog signals (30) from each of the sensors (12) placed upon the wafer (10) and converts the analog signals (30) to corresponding digital signals (figure 3; column 10, lines 38-68; column 11, lines 1-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include converting analog signals to digital signals using an analog to digital converter, as suggested by Smesny, because digital signals can be more accurately processed by the data processing system/module

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(850) including an external data processing device and digital signals would be easier to be converted into useful information (read Lauf, column 4, lines 37-42).

(d) As to claim 32, Lauf does not expressly disclose that the wireless/radio frequency (RF) transceiver/transmitter (750) and antenna (770) transmits and receives sonic signals.

Smesny discloses probe pad (26) providing an optical or acoustic/sonic connection with an external communication device in order to exchange data related to the real time processing conditions so that it can be optimally controlled.

It would be obvious to one of ordinary skill in the art at the time the invention was made to achieve Lauf's communication with the processing remote processing system by sending/receiving acoustic/sonic signals from/with the transmitter (750)/antenna (770), as suggested by Smesny, because such an acoustic/sonic communication would enable the data related to the real time processing conditions of wafer (710) to be communicated with the remote data processing system and thus be optimally controlled/processed.

(e) As to claim 33, Lauf does not expressly that the data transmission circuitry/transmitter (750) and antenna (770) comprises one or more connectors to couple a remote system to the device with a communications cable.

Smesny teaches probe pad (26), which can provide a mechanical access/connection of the wafer (10) to an external communication device.

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include mechanical connectors for connecting the data transmission circuitry/transmitter (750) and antenna (770) of the wafer (710) with a remote system, as suggested by Smesny, because this would allow mechanical access from an external output device such as, for instance, the data information stored within the memory of circuit (730).

11. Claims 23, 29 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Schwartz et al. (US Patent 5,669,713 henceforth "Schwartz").

(a) As to claims 23, 29 and 34, Lauf does not expressly disclose that the electronics module/signal conditioning circuit (730) or the remote data processing system/module (850) (including an external data processing device) comprises a micro-controller and is configured to process the output signal using sensor calibration coefficients to provide a final output value.

Schwartz discloses, in a patent entitled "calibration of process control temperature transmitter", calibrating resistance or thermocouple type temperature sensors (16, 18), with a calibration device, in order to derive a calibration value R_{PRTCAL} (NEW) with a micro-controller/microprocessor (22) and provide a final output value (figure 5; column 1, lines 13-34; column 7, lines 30-67; column 8, lines 1-5)

It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include a micro-controller for processing the output signals from the resistance type temperature sensors (720) using sensor calibration coefficients/values and get a final output value, as suggested by Schwartz, because this provides a compact device as a rapid and accurate means of correcting temperature values against an accurate standard.

While Schwartz teaches no particular location for where the calibration processing should occur, Examiner considers it would have be obvious to one of ordinary skill in the art at the time the invention was made to process the calibration of the signals either at the electronics module/signal conditioning circuit (730) or at the remote data processing system/module (850) (including an external data processing device), since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70 (CCPA 1950).

12. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lauf, as applied to claims 21, 28, 30, 31 and 35 above, and further in view of Renken et al. (US Patent 6,190,040 henceforth "Renken").

(a) As to claim 36, Lauf does not expressly disclose the leads (740) being from a ribbon cable.

Renken teaches ribbon cables 52, 62 in a similar application.

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It would be obvious to one of ordinary skill in the art at the time the invention was made to modify Lauf's apparatus to include leads from a ribbon cable, as suggested by Renken, because such leads have many advantages like extremely small bending radius, high flexibility and minimum waste of space.

Allowable Subject Matter

13. Claims 45 and 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon, cited in the attached 892 form, is considered pertinent to applicant's disclosure.

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of


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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samir M. Shah whose telephone number is (571) 272-2671. The examiner can normally be reached on Monday-Friday 9:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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Art Unit 2856
03/22/2007


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